preparation have decreased risks. The best results have been reported using central venous placement of a silastic catheter (Hickman or Broviac) with a subcutaneous tunnel and a Dacron cuff to prevent ascending infection. The catheter may be placed using local anesthesia via cutdown or simply percutaneous subclavian placement through a breakaway introducer. Preformulated home total parenteral nutrition solutions are available, though many long-term patients may be taught to safely prepare solutions at home with a greatly decreased cost and a heightened feeling of independence.

Benefits are significant. In adults normal body composition and weight develop and in children with Crohn's disease and in neonates, normal growth patterns develop. Most patients are able to obtain adequate nutrition by continuous infusion while sleeping and may resume normal activities during the day; in one report, 70 percent of patients returned to usual employment. Costs of approximately $20,000 a year are significantly less than in-hospital therapy and complications have been much less frequent than that generally reported for in-hospital parenteral nutrition.

JOHN P. SHERCK, MD

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Carotid Endarterectomy

ENDARTERECTOMY of the common carotid bifurcation has become established as a popular operation, with 40,000 done annually. It has a low risk, averaging 2 percent to 3 percent combined morbidity and mortality in most experienced centers.

Its role in the treatment of transient ischemic attacks is well accepted. The role in the treatment of asymptomatic lesions is less clear. Tight stenoses, bilateral stenoses and large or compound ulcers (which are better described as compound deformities rather than ulcers) are being accepted as anatomic indications for operation. The large compound ulcer is associated with a stroke rate of 7½ percent per year; even intermediate (type B) ulcers have a rate of 4½ percent per year. Combined, their average is that of the risk rate of stroke in the presence of transient ischemic attacks, though the risk of an ulcerative lesion increases with time instead of being maximal in early follow-up years.

Noninvasive evaluation of the carotid artery has become increasingly sophisticated and shows promise of increasing accuracy in identifying ulcerated, nonstenotic lesions. The usefulness of noninvasive evaluation of a symptomatic carotid lesion is limited, however, and negative findings from noninvasive studies should never preclude arteriography in a symptomatic patient. The real clinical role lies in the evaluation of asymptomatic lesions and in following patients after operation.

Digitalized subtraction angiography has not yet fully supplanted noninvasive or physiologic studies or classical arteriography.

In the conduct of the operation itself, the use of the shunt remains debatable. Its use is generally accepted in the presence of stump pressures below 25 torr, when serious stenosis exists contralaterally, and in poststroke patients. Some surgeons, however, never use the shunt. Few surgeons use patches except in very small arteries and, as a rule, use only autologous tissue.

Open operative dilatation of difficult-to-reach fibromuscular lesions is now standard, but percutaneous transluminal angiography is not acceptable because of its inherent risk of distal embolic formation.

WILEY F. BARKER, MD

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Vascular Access for Treatment of Acute Renal Failure

ALTHOUGH THE Quinton-Scribner arteriovenous shunt remains the most widely used form of vascular access for acute hemodialysis, there exists a significant number of patients for whom this procedure is not well suited. This group is often better served by some form of venovenous access. Such access usually requires placing two catheters into the iliofemoral venous system using the Seldinger technique. It is even possible to use single-needle dialysis equipment that alternately removes and returns blood through one cannula.

The venovenous method has become the preferred method when there are contraindications to the use of an arteriovenous shunt. Hemodynamically unstable patients present several problems. Hemodialysis tends to cause episodes of hypotension with poor blood flow from the arterial cannula. Also in such patients thrombosis frequently develops in their arteriovenous shunts between dialyses. With venovenous access flow can be maintained during hypotensive periods and catheters are usually removed between treatments. Patients in whom renal recovery is unlikely to occur should have venovenous access, because the use of an external arteriovenous shunt limits the sites available for the more durable subcutaneous access necessary for ongoing hemodialyis. Some patients lack the vasculature necessary for Quinton-Scribner shunts because of arteriosclerosis, drug abuse, major burns or use for intravenous or intraarterial cannulas. Finally, because of the simplicity and greater ease of placement in the setting of an intensive care unit, patients who are likely to require only one or two dialysis treatments (for example, drug overdose patients) are best served by venovenous dialysis.

There has been some concern regarding thromboembolic complications with repeated femoral vein catheterization, particularly when catheters are left in place.